

Geophysical Research Abstracts
Vol. 14, EGU2012-6314-1, 2012
EGU General Assembly 2012
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Geologic interpretation of the near-infrared images of area SW of Beta Regio taken by the Venus Monitoring Camera

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We analyze night-time near-infrared (NIR) images of Beta-Phoebe region obtained with the 1- μ m channel of the Venus Monitoring Camera (VMC) onboard Venus Express. Comparisons with the results of the Magellan radar survey and the model NIR images show that the night-time VMC images provide reliable information on spatial variations of the NIR surface emission.

Here we consider if tessera terrain has the different NIR emissivity (and thus mineralogical composition) in comparison to the surrounding basaltic plains. This is done through the study of an area SW of Beta Regio where there is a massif of tessera terrain, Chimon-mana Tessera, surrounded by supposedly basaltic plains. Our analysis showed that 1- μ m emissivity of tessera surface material is by 15–35 % lower than that of relatively fresh supposedly basaltic lavas of plains and volcanic edifices. This is consistent with hypothesis that the tessera material is not basaltic, maybe felsic, that is in agreement with the results of analyses of VEX VIRTIS and Galileo NIMS data. If the felsic nature of venusian tesserae will be confirmed in further studies this may have important implications on geochemical environments in early history of Venus.

We have found that the surface materials of plains in the study area are very variegated in their 1- μ m emissivity, which probably reflects variability of degree of their chemical weathering.

We have also found a possible decrease of the calculated emissivity at the top of Tuulikki Mons volcano which, if real, may be due to different (more felsic?) composition of volcanic products on the volcano summit.